Claim Language	Present In Kono?	Kono Disclosure
2. A cellular telephone location system as recited in claim 1,	Yes	See the above claim chart for claim 1.
wherein said timing signal receiver comprises a global positioning system (GPS) receiver.	Yes	Since at least as early as 1993, some cellular networks have had GPS receivers at every base station. The location systems disclosed in the Kono reference and the '144 patent work in conjunction with cellular networks. When those cellular networks have GPS receivers, they can be used by the location system.

Claim Language	Present In Kono?	Kono Disclosure
22. A ground-based cellular telephone system serving a plurality of subscribers possessing mobile cellular telephones, comprising:	Yes	"FIG. 1 shows a configuration of a moving body position locating apparatus" Page 3 ¶ 6, ll. 12.
(a) at least three cell sites;	Yes	Base stations 3a-3n.
equipped to receive signals sent by multiple mobile cellular telephones	Yes	Control channel transceivers ***12a-12n***.
each initiating periodic signal transmissions	Yes	"a moving body transmits position locating signals using shared channels" Page 3 ¶ 5, l. 1.
over one of a prescribed set of reverse control channels	Yes	"***12a – 12n*** are control channel transceivers that transmit and receive signals for the control channels allotted for each of the base stations ***3a – 3n.***" Page 2, ¶ 2, ll. 5-6.
(b) locating means for automatically determining the locations of said cellular telephones by receiving and processing signals emitted during said periodic reverse control channel transmissions; and	Yes	Kono teaches software and processors in control unit ***55*** that determine and format time of arrival information. "The standard clock ***54*** is an ultra-high precision clock, and the time measurement circuit ***53*** measures the absolute time of the above-mentioned trigger, and reports it to the switching station ***1*** from the control circuit ***55*** via the control device ***11***." Page 5, ¶ 3. ll. 13-15. "The base station ***1*** forwards these data to the position location calculating device ***2***, and the position of the mobile equipment ***5*** is calculated." Page 4, ¶ 2, ll. 23-25.

(c) database means for storing location data identifying the cellular telephones and their respective locations, and for providing access to said database to subscribers at remote locations.	Yes	Since their inception in the early 1990s, GSM networks have had Home Location Registers ("HLRs") and Visitor Location Registers ("VLRs"). Because Andrew's products do not have a database, if TruePosition argues for an interpretation of "database means" that is broad enough to encompass Andrew's products, this element is anticipated by the HLR and VLR inherent in the cellular systems taught by the Kono application.

Claim Language	Present In Kono?	Kono Disclosure
31. A method for determining the location(s) of one or more cellular telephones	Yes	"FIG. 1 shows a configuration of a moving body position locating apparatus" Page 3 ¶ 6, ll. 12.
each initiating periodic signal transmissions over one of a prescribed set of reverse control channels, comprising the steps of:	Yes	"a moving body transmits position locating signals using shared channels" Page 3 ¶ 5, l. 1.
(a) receiving said reverse control channel signals at least three geographically separated cell sites;	Yes	***"12a – 12n*** are control channel transceivers that transmit and receive signals for the control channels allotted for each of the base stations ***3a – 3n."*** Page 2, ¶ 2, ll. 5-6.
(b) processing said signals at each cell site to produce frames of data, each frame comprising a prescribed number of data bits and time stamp bits, said time stamp bits representing the time at which said frames were produced at each cell site;	Yes	Kono teaches software and processors in hardware unit 55 that determine and format time of arrival information. Time stamp bits: "The standard clock ***54*** is an ultra-high precision clock, and the time measurement circuit ***53*** measures the absolute time of the above-mentioned trigger, and reports it to the switching station ***1*** from the control circuit ***55*** via the control device ***11***." Page 5, ¶ 3. ll. 13-15. Data bits: "It should be noted that the junction points ***22a – 22n*** are used for voice communication signals, and the junction points ***23a – 23n*** are used for data or control signals." Page 5, ¶ 1, ll.15-17.

(c) processing said frames of data to identify individual cellular telephone signals and the differences in times of arrival of said cellular telephone signals among said cell sites; and	Yes	"reports to the switching station *1* via the control devices *11a – 11n* data such as the difference in arrival time of position locating signals with respect to the various base stations *3a – 3n*." Page 4, ¶ 2, ll. 21-23.
determining, on the basis of said times of arrival differences, the locations of the cellular telephones responsible for said cellular telephone signals.	Yes	"The base station *1* forwards these data to the position location calculating device *2*, and the position of the mobile equipment *5* is calculated." Page 4, ¶ 2, ll. 23-25.

Claim Language	Present in Kono?	Kono Disclosure
32. A method as recited in claim 31,	Yes	See the above claim chart for claim 31.
further comprising the steps of storing, in a database, location data identifying the cellular telephones and their respective locations, and providing access to said database to subscribers at remote locations.	Yes	Since their inception in the early 1990s, GSM networks have had Home Location Registers ("HLRs") and Visitor Location Registers ("VLRs"). Because Andrew's products do not have a database, if TruePosition argues for an interpretation of "database means" that is broad enough to encompass Andrew's products, this element is anticipated by the HLR and VLR inherent in the cellular systems taught by the Kono application.

IV. RESERVATION OF RIGHTS

This report presents my opinions to date regarding the matters set forth above. As additional data, information, or testimony becomes available to me or is provided to me, I intend to consider this information. I thus reserve the right to modify or supplement this report or the opinions contained herein if I find it appropriate to do so in light of any additional information. I may also be called upon to, and intend to if asked, provide expert testimony in rebuttal to any proofs put forth by TruePosition or any opinions expressed in expert reports on behalf of TruePosition.

***

Dated: December 1, 2006

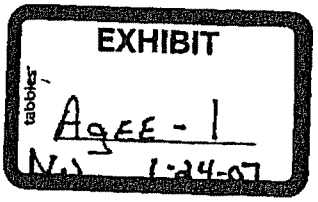
David J. Goodman

Dr. David J. Goodman

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TruePosition, Inc.,	
Plaintiff/ Counterclaim-Defendant,	C.A. No. 05-747 (SLR)
v.	
Andrew Corporation,	
Defendant/ Counterclaim-Plaintiff.	

EXPERT REPORT OF BRIAN G. AGEE, PH.D., P.E.
RESPONSE TO DR. DAVID GOODMAN'S REPORT ON THE VALIDITY OF U.S. PATENT NO. 5,327,144



1 INTRODUCTION

I have been retained by TruePosition, Inc. ("TruePosition") as a technical expert in the case noted on the front cover of my report. I expect to testify at trial regarding the matters set forth in this report if asked to do so by TruePosition or the Court. I also will be prepared to provide the Court and the jury a tutorial on the technology involved in this matter should TruePosition or the Court ask that I do so. I am being compensated for my work in this case at my customary rates of $275 per hour for non-testimonial matters and $330 per hour for testimonial matters. However, my compensation does not depend on the outcome of this case, the opinions I express or the testimony I may give.

I understand that TruePosition, Inc. has asserted claims 1, 2, 22, 31 and 32 of U.S. Patent No. 5,327,144 (the "144 Patent") against a product manufactured and sold by Andrew Corporation ("Andrew"). I also understand that Dr. David Goodman has prepared a report on behalf of Andrew (the "144 Patent Invalidity Report") contending that the asserted claims of the 144 Patent are invalid because they are supposedly anticipated by unexamined, Japanese Patent Application Kokai (Laid-Open) Publication No. H3-239091 ("Kono"). Although Dr. Goodman recites his understanding of legal standards relevant to an obviousness analysis, based on my reading of the 144 Patent Invalidity Report, Dr. Goodman has not expressed any opinion(s), or provided any analysis, regarding alleged invalidity of the 144 patent on any basis other than alleged anticipation by Kono.

For the reasons stated in Section 3 below, it is my expert opinion that Kono does not anticipate or render invalid the asserted claims of the 144 Patent.

2 BACKGROUND AND QUALIFICATIONS

2.1 Qualifications

A copy of my current Curriculum Vitae is attached to this report as Exhibit A. My relevant qualifications for this project are summarized below.

I am currently the President of B³ Advanced Communication Systems (B3), which performs engineering research and development activities for commercial and U.S. government applications and clients. In this capacity, I have developed, analyzed, and tested multiple algorithms for geolocation of signal emitters using observable features of those signals, including their time-of-arrival (TOA) or time-difference-of-arrival (TDOA) at networks of collection platforms, and developed analysis and visualization tools to predict the ability to detect, copy, and geolocate emitters using varieties of collection networks, platforms, and signal features. I have also currently hold a position as an Adjunct Research (Full) Professor at the Virginia Polytechnic Institute (Virginia Tech), where I am performing research and guiding graduate students development of collaborative communication and signal analysis networks, and in development of algorithms and techniques for characterization (detection, identification, and geolocation) and management of structured and unstructured interference in conventional and cooperative 802.11 enterprise networks.

From 2001-2004, I was President, and Chief Technical Officer of Protean Radio Networks (Protean), a developer of spatially adaptive transceivers and mesh networking technology for wireless communication systems and networks. From 1998-2001, I was self-employed as a consulting engineer, and performed independent research and development of spatially adaptive transceivers and mesh networking technology for wireless communication systems and networks. As part of these activities, I developed algorithms for geolocation of cellular telecommunication signals in urban multipath environments.

From 1990-1998, I was Director of Engineering Studies (1990-1996), and Director of Advanced Concept Development (1996-1998), at Radix Technologies, Inc., a developer of systems, equipment, and technology for commercial and United States government (USG) funded communication, collection, and analysis systems. From 1990-1996, I developed or led development of the core system concepts and algorithms for all of Radix's major signal collection and analysis projects. In mid-1993, I began development of Radix's first two-way telecommunications project. From mid-1993 through early 1998, I also developed or led development of the core system concepts and algorithms for all of Radix's telecommunications projects. From mid-1996 through early 1998, I also launched the development of Radix's Geophone system for infrastructure-based geolocation of CDMA (IS-95A) handsets, led the initial feasibility analysis and concept/algorithm development for the system, and participated in Radix's initial business development efforts in the commercial geolocation area. During the initial stages of this project, I first encountered and gained familiarity with the 144 Patent.

As part of my other activities at Radix Technologies, I developed or led the development of numerous additional systems and methods to geolocate signal emitters based on features of those signals, including methods that exploited the internal structure of those signals to obtain performance benefits well beyond the capabilities of competing geolocation technologies. Cer-

tain of these development activities provided me with close familiarity with the attributes of cellular telephony networks in use in the mid-1990s, including elements of the AMPS, IS-54, IS-95A, and GSM air interfaces, and the overall cellular networking concept and infrastructure.

From 1984-1991, I was self-employed as a consulting engineer (1984-1991) while completing my Masters degree (1984-1985) and pursuing my Doctorate (1985-1989) in Electrical Engineering at the University of California at Davis. As part of my consulting and Doctoral work during this period, I developed geolocation algorithms based on TDOA of signal features from networks of collection platforms, and using techniques that exploited the internal structure of the signals of interest to the collection network, as well as variations and generalizations of cross-correlation processing techniques under investigation by the US Government for geolocation of structured man-made signals, including for example, cross-ambiguity function (CAF) processing. During this period, I also became a Licensed Professional Engineer in the State of California (CA License No. E012727).

From 1979-1984, I was employed as a Member of Technical Staff at ARGOSystems, Inc., a developer of systems, equipment, and technology for USG collection, and analysis systems. As part of my work there, I was actively involved in the development of signal collection and geolocation methods based in part on TDOA of those signals from multiple collection platforms using variations and generalizations of cross-correlation processing techniques, including CAF processing techniques.

2.2 List of Patents and Publications

A list of patents and publications that I have authored since 1988 is attached to this report as Exhibit B.

2.3 Prior Expert Testimony

In the past four years I have not provided expert testimony at trial, or by way of deposition.

2.4 Information Relied On

A list of the materials that I have considered in reaching my opinions is attached as Exhibit C to this report.

3 OPINIONS AND BASES FOR THE OPINIONS

3.1 Legal Standards

Although I am not a lawyer, I have been advised of certain legal principles that I accept for purposes of my analysis.

I understand that issued U.S. patents are presumed valid, and that in order to prove a patent is invalid requires clear and convincing evidence. I understand clear and convincing evidence to be evidence that creates an abiding conviction that the truth of a particular contention is highly probable.

I understand that the meaning and scope of the claims must be determined, *i.e.*, construed, prior to assessing the validity of the claims.

I understand that claim terms are generally construed as having their ordinary and customary meaning, which is the meaning that the terms would have to a person of ordinary skill in the art in question at the time of the claimed inventions, *i.e.*, as of the effective filing date of the patent application.

I understand that a person of ordinary skill in the art is deemed to read claim terms not only in the context of the particular claim in which the term appears, but in the context of the entire patent, including the specification, and the prosecution history of the patent before the United States Patent and Trademark Office.

I understand that the claim constructions used for an infringement analysis must be the same claim constructions used for an invalidity analysis.

I understand that an invalidity analysis should be done on a claim-by-claim basis. Or in other words, that the validity of each claim must be analyzed and determined separately.

I understand that, once the claims have been construed, the next step in assessing validity is deciding whether or not the prior art shows or teaches each of the specified elements or limitations of the claims.

I understand that in order for a prior art reference to anticipate a claim, the reference must disclose each and every element of the claim with sufficient clarity to prove its existence in the prior art, and the reference must have the elements arranged in the same manner as the claimed invention.

I also understand that if a single prior art reference does not expressly teach each element or limitation of a claim, then the reference anticipates the claim only if a person having ordinary skill in the art at the time the claimed invention was made would understand how the element or limitation that is not expressly taught is necessarily present in the prior art reference. I understand that this is referred to as inherency.

I further understand that an inherent limitation is one that is necessarily present and not one that may be established by probabilities or possibilities. That is, an element or limitation is not inherently disclosed by the mere fact that a certain thing may result from a given set of circumstances. I also understand that while the inherent disclosure requirement presupposes the knowledge of one skilled in the art at the time of the invention, that presumed knowledge does not allow one to read into the prior art reference teachings that are not there, and an expert's conclusory testimony, unsupported by the documentary evidence, cannot supplant the requirement of anticipatory disclosure in the prior art reference itself.

I also understand that in order for a single prior art reference to anticipate a claimed invention, that reference must not only disclose all of the limitations of the claimed invention, but also be enabling. I understand a reference to be enabling when its disclosures or teachings are sufficient to allow one having ordinary skill in the art at the time to make and use the claimed invention without undue experimentation.

I understand that a patent claim is invalid as having been obvious if the differences between the claimed subject matter and what is taught by the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art at the time that the claimed invention was made. I understand that in making this determination there are four inquiries:

1 The scope and content of the relevant prior art must be determined.

2 The level of ordinary skill in the art must be considered.

3 The differences between the claimed invention and the teachings of the prior art must be determined.

4 Other factors, sometimes referred to as secondary considerations of nonobviousness, should be considered if present. These factors can include:

   (a) any commercial success tied directly to use of the invention;

   (b) any long-felt but unresolved need for the claimed invention;

   (c) any failure of others to come up with the claimed invention;

   (d) any copying of the claimed invention by others; and

   (e) any unexpected results flowing from use of the claimed invention.

Finally, I understand that it is impermissible and improper to use hindsight when conducting an obviousness analysis.

3.2 Level Of Ordinary Skill In The Art

I disagree with Dr. Goodman's opinion regarding the level of ordinary skill in the art at the time the inventions claimed in the 144 Patent were made. In my expert opinion, a person having ordinary skill in the art at the time the inventions claimed in the 144 Patent were made would have had either (1) a Bachelors Degree in Electrical Engineering, Applied Mathematics, Computer Science, and/or Physics, and 5 years of experience at a company specializing in development of systems, equipment, or technology for military or commercial telecommunications, signal collection and analysis, or other wireless signal processing, or (2) a Masters Degree in the same subjects and 2 years of experience in the same industries.

In particular, I disagree with Dr. Goodman's opinion that a person of ordinary skill in the art at the time of the inventions claimed in the 144 Patent would have experience working for a cellular operating company or a company that designs/produces cellular systems or services.

My opinion is based in part on my own experience with development of systems for commercial and noncommercial geolocation of emitters of communication waveforms, including cellular telephone handsets. I gained my first exposure to geolocation methods, and developed my first algorithms and concepts for geolocation of structured waveform emitters, as a young engineer with a Bachelors degree in Electrical Engineering and Mathematics, two years of Masters coursework, and roughly two years of experience in industry. And I worked with engineers with similar experience, and with no prior background in the cellular telephone industry, to develop Radix's first system for cellular handset geolocation in the mid-1990's. My opinion is also based on the simple fact that the cellular telephone industry was still in an early stage of development at the time of this inven-

tion, such that the majority of individuals with ordinary skill in the art in the disciplines listed above worked outside of the cellular telephone industry.

3.3 Opinions

As noted in Section 1, I disagree with Dr. Goodman's conclusion that Kono anticipates the asserted claims of the 144 Patent. In my expert opinion, Kono fails to teach one having ordinary skill in the art at the time of the invention, either expressly or inherently, numerous limitations in the asserted claims of the 144 Patent. My ultimate conclusion is the same under either of the parties proposed constructions of certain claim terms in the 144 Patent.

In addition, in my expert opinion, Kono is not enabling because its disclosure would not allow a person of ordinary skill in the art at the time the 144 Patent was filed to make and use the inventions in the asserted claims of the 144 Patent without undue experimentation, and with a reasonable expectation of having the systems and methods work. It is also my expert opinion that a person having ordinary skill in the art at the time the 144 Patent was filed could not make and use the system disclosed and described in Kono without undue experimentation, and with a reasonable expectation of having the system work. Moreover, in my expert opinion, Kono contains substantive deficiencies that would prevent it from providing usable position location information in any realistic cellular telephony use scenario.

Lastly, in my expert opinion, the prior art considered during the examination of the 144 patent teaches the same material disclosed in Kono, in much greater detail than Kono, and is therefore just as pertinent to the 144 patent as Kono, if not more pertinent. In particular, three of the patents considered during the 144 Patent prosecution, and one of the patents cited by the U.S. Patent Office in its Office Action during this Prosecution (the Sagey 618 Patent), teach every element of the subject matter disclosed in Kono.

The Sections and Tables below present my opinion in further detail. Section 3.3.1 states my conclusions regarding the relation of Kono to the asserted claims of the 144 Patent. Section 3.3.2 states my opinion of Kono's failure to enable and other deficiencies in Kono. Section 3.3.3 states my opinion of Kono being no more pertinent than the prior art considered during examination of the 144 Patent. Section 3.3.4 discusses other matters pertinent to my opinion.

3.3.1 Opinions Relating to Kono and the Asserted Claims of the 144 Patent

A summary of my conclusions regarding the deficiencies in Kono's teachings to one having ordinary skill in the art at the time of the claimed invention and the limitations in the asserted claims of the 144 Patent is provided in Table 3-1 through Table 3-5 below, for asserted Claim 1 (Table 3-1), 2 (Table 3-2), 22 (Table 3-3), 31 (Table 3-4) and 32 (Table 3-5) in the 144 Patent. My detailed opinions supporting these conclusions is provided in Subsection 3.3.1.1 through Subsection 1, for asserted Claim 1 (Subsection 3.3.1.1), 2 (Subsection 3.3.1.2), 22 (Subsection 3.3.1.3), 31 (Subsection 3.3.1.4), and 32 (Subsection 3.3.1.4) in the 144 Patent.

In forming my opinions, I am relying upon the separate Claim Constructions provided by Andrew on 22 November 2006 ("Andrew Claim Constructions"), and provided by TruePosition on 11 December 2006 ("TruePosition Claim Constructions"). Because these Claim Constructions are different, I provide a separate conclusion under each Claim Construction in these Tables. In cases where a specific Claim limitation is not defined by Andrew, but can be constructed from multiple Andrew Claim Constructions, I am assuming that limitation comprises all of those Claim Constructions, e.g., I interpret "reverse control channel" to be constructed from Andrew's Claim Constructions for "reverse" AND "control channel." In cases where neither Andrew nor TruePosition has proposed a Claim Construction, I provide an opinion based on the ordinary and customary meaning for each term. Lastly, in several instances, I disagree with Andrew's Claim Constructions, and/or find that they contain substantive ambiguities that I must resolve in order to make a conclusion about the element addressed by that Claim. A list of these disagreements and ambiguities, and of my interpretation of ambiguities, is provided in Subsection 3.3.4.1 (Table 3-7).

In forming my opinions, I am principally relying on TruePosition's translation of the original (Japanese language) version of the specification of Kono into English (TruePosition Kono Translation), and on the Lexis translation of the abstract of Kono into English (Kono Abstract Translation). This is because (a) I do not understand the Japanese language, in either its written or spoken form, and (b) Andrew's translation of Kono possesses significant deficiencies, most notably in its failure to translate Kono's Figures into English. A listing of differences between these translations that I have currently recognized is provided in Subsection 3.3.4.2 below.

Table 3-1: Summary of Opinions Related to Kono and Claim 1 of the 144 Patent (Detailed Opinion in Subsection 3.3.1.1)

Claim 1 Language	Missing in Kono Under		
	Andrew Claim Constructions	TruePosition Claim Constructions	Ordinary & Customary Meaning
1. A cellular telephone location system for determining the locations of multiple cellular telephones			
each initiating			
periodic signal transmissions			
over one of a prescribed set of			
reverse control channels;			
comprising:			
(a) at least three cell site systems,			
each cell site system comprising:			
an elevated ground-based antenna;			
a baseband convertor operatively coupled to said antenna	Missing	Missing	
for			
receiving cellular telephone signals transmitted over a reverse control channel by said telephones			
and			
providing baseband signals derived from the cellular telephone signals;			
a			
timing signal			
receiver			Missing
for receiving a timing signal common to all cell sites			
and			
a sampling subsystem			Missing.
operatively coupled to			
said timing signal receiver			
and			
said baseband convertor			
for			
sampling said baseband signal at a prescribed sampling frequency			Missing.
and			
formatting the sample signal into frames of digital data,			Missing.
each frame comprising			
a prescribed number of data bits			Missing.
and			
time stamp bits,			
said time stamp bits representing the time at which said cellular telephone signals were received;			
and			
(b) a central site system operatively coupled to said cell site systems,			
comprising:			
means for processing said frames of data from said cell site systems	Missing	Missing	
to generate a table			
identifying			

Claim 1 Language	Missing in Kono Under		
	Andrew Claim Constructions	TruePosition Claim Constructions	Ordinary & Customary Meaning
individual cellular telephone signals	.....		
and			
the differences in times of arrival of said cellular telephone signals among said cell site systems;			
and			
means for determining, on the basis of said times of arrival differences, the locations of the cellular telephones responsible for said cellular telephone signals.	Missing	Missing	

Table 3-2: Summary of Opinions Related to Kono and Claim 2 of the 144 Patent (Detailed Opinion in Subsection 3.3.1.2)

Claim 2 Language	Missing in Kono Under		
	Andrew Claim Constructions	TruePosition Claim Constructions	Ordinary & Customary Meaning
2. A cellular telephone location system as recited in Claim 1,			
wherein			
said			
timing signal			
receiver			Missing
comprises			
a global positioning system (GPS) receiver.			Missing

Table 3-3: Summary of Opinions Related to Kono and Claim 22 of the 144 Patent (Detailed Opinion in Subsection 3.3.1.3)

Claim 22 Language	Missing in Kono Under		
	Andrew Claim Constructions	TruePosition Claim Constructions	Ordinary & Customary Meaning
22. A ground-based cellular telephone system serving a plurality of subscribers possessing mobile cellular telephones,			
comprising:			
(a) at least three cell sites			
equipped to receive signals sent by multiple mobile cellular telephones			
each initiating			
periodic signal transmissions			
over one of a prescribed set of			
reverse control channels;			
(b) receiving signals	Missing	Missing	
and automatically determining the locations of said cellular telephones			
by			
(c) receiving and processing signals emitted during periodic reverse control channel transmissions	Missing	Missing	
and			

Claim 22 Language	Missing in Kono Under		
	Andrew Claim Constructions	TruePosition Claim Constructions	Ordinary & Customary Meaning
(c) database means for storing location data by identifying the cellular telephones and their respective locations, and for providing access to said database to subscribers at remote locations;	Missing	Missing	

Table 3-4: Summary of Opinions Related to Kono and Claim 31 of the 144 Patent (Detailed Opinion in Subsection 3.3.1.4)

Claim 31 Language	Missing in Kono Under		
	Andrew Claim Constructions	True-Position Claim Constructions	Ordinary & Customary Meaning
31. A method for determining the location(s) of one or more mobile cellular telephones			
periodically transmitting signals			
over one of a prescribed set of			
reverse control channels,			
comprising the steps of:			
(a) receiving said reverse control channel signals at at least three geographically separated cell sites;	Missing	Missing	
(b) processing said signals at each cell site to produce			Missing
frames of data			
each frame comprising a prescribed number of			
data bits			
and			
time stamp bits,			
said time stamp bits representing the time at which said frames were produced at each cell site.			
(c) processing said frames of data			Missing
to identify			
individual cellular telephones			
and			
the difference in times of arrival of said cellular telephone signals among said cell sites;			
and			
(d) determining, on the basis of said times of arrival differences, the locations of the cellular telephones responsible for said cellular telephone signals.	Missing	Missing	

Table 3-5: Summary of Opinions Related to Kono and Claim 32 of the 144 Patent (Detailed Opinion in Subsection 1)

Claim 32 Language	Missing in Kono Under		
	Andrew Claim Constructions	TruePosition Claim Constructions	Ordinary & Customary Meaning
32. A method as recited in claim 31, further comprising the steps of			
storing, in a database, location data identifying	Missing	Missing	
the cellular telephones			
and			

Claim 32 Language	Missing in Kono Under		
	Andrew Claim Constructions	TruePosition Claim Constructions	Ordinary & Customary Meaning
their respective locations.			
and			
providing access to said database to subscribers at remote locations.	Missing	Missing	

3.3.1.1 Detailed Opinions Relating to Kono and Claim 1 of the 144 Patent

A summary of my conclusions regarding the teachings of Kono to one having ordinary skill in the art at the time and the limitations in Claim 1 of the 144 Patent is set forth in Table 3-1 above. My opinions can be summarized as follows:

- Kono fails to teach reception and provision of *reverse control channel* cellular telephone baseband signals as part of its invention. The "common channel receiver" that performs this function in Kono instead receives and provides the [baseband] *position location signal* transmitted from the mobile over the "common channel" defined in Kono. This common channel is *not* a control channel under both the Andrew Claim Constructions and the TruePosition Claim Constructions.
- Kono fails to teach mobile initiation of signals used for position location. Instead, position location signals are always transmitted in response to a call from the base station transceiver.
- Kono fails to teach a timing signal *receiver* receiving a timing signal common to all cell sites.
- Kono fails to disclose or teach "a sampling subsystem ... for sampling [a] baseband signal" of any sort. Figure 2 of Kono instead presents a subblock *51*, referred to as a *Wave detector* in the Figure, and a *detector/decoder* in the text, that does not implement a sampling function.
- Kono fails to disclose or teach "formatting of the sampled baseband signal ... into frames of digital data comprising *data bits*" and time stamp bits. Kono only teaches reporting of the mobile unit zone location from the nearest (strongest) base station, and reporting of timing data derived from the position location to the exchange office.
- Kono fails to disclose or teach means for processing said data frames from cell site systems (base station transceivers in Kono) to generate a table of any sort, much less the processing means defined by both the Andrew Claim Constructions and the TruePosition Claim Constructions.
- Kono fails to disclose or teach *any* means for determining, on the basis of times of arrival differences, the locations of cellular telephones, much less the specific locating means defined by both the Andrew Claim Constructions and the TruePosition Claim Constructions.

My detailed opinions supporting these conclusions are provided below.

Kono fails to teach reception and provision of *reverse control channel* cellular telephone baseband signals

Kono fails to teach reception and provision of *reverse control channel* cellular telephone baseband signals, i.e.,

> "... a baseband convertor operatively coupled to said antenna for receiving cellular telephone signals transmitted over a reverse control channel by said telephones and providing baseband signals derived from the cellular telephone signals;" (144 Patent, Col 20, ll 10-14)

as an expresss or inherent part of its invention. Dr. Goodman and I both agree that the corresponding device to the "baseband convertor ..." in the Kono application would be contained within the common channel receiver *16a-16n* in Figure 1 (first embodment) and Figure 4 (second embodiment) of Kono, specifically, the processing steps comprising blocks 41-50 in Figure 2 of Kono, and possibly comprising block 51 of Kono (denoted a "Wave detector" in Figure 2, and a "detector/decoder" in the text describing that block). In particular, on page 13 of his report, Dr. Goodman writes (highlights mine):

> "Claim 1 of the '144 patent also includes a 'baseband converter' for receiving the periodic transmissions on the reverse control channels. The corresponding device in the Kono application is a shared channel receiver at each base station (*16a-16n*)

Comparison of Figure 1 and Figure 4 (prior art) in Kono reveals that the *only* differences between the prior art and the invention in Kono is the replacement of the "Locator Receiver *13a-13n*" in Figure 4 with the "Common Channel Receiver *16a-16n*" in Figure 1. Moreover, in the second embodiment of Kono's invention (Figure 3), position location bureaus that comprise *only* common channel receivers are taught, i.e., the control channel (and voice channel) transceivers are dropped.

Moreover, the position location signals in Kono are not expressly or *inherently* control signals, under either Andrew's or TruePositions Claim Constructions. The only attribute of the position location signals that are taught by Kono is the 14-bit Unique Word (UW). Neither the structure of the Unique Word (bit sequence, relationship of bit sequence to channel, or relationship of bit sequence to individual users), nor the modulation format of the Unique Word, nor any other component of the position location signal, is taught in Kono. In fact, Kono fails to state whether the Unique Word is unique to the *user*, or unique to the *common channel*, i.e., if the position location signal is identical for every user that accesses the channel.

Based on definitions of "Unique Word" (UW) bit sequences encountered in other cellular air interfaces, the UW is likely meant to be a bit pattern that is unique to the channel. For example, the Personal Handy Phone System (PHS), a microcellular telephone system developed in 1989 principally by NTT Laboratories and standardized by the Association of Radio Industries and Businesses (ARIB) as RCR STD-28, defines 16 bit and 32 bit Unique Words for traffic-bearing communication physical slots, synchronization bursts (defined as communication physical slots in RCR STD-28) and control physical slots, on both the PHS downlink (reverse link) and uplink (forward link) (see for example, PHS Association of Radio Industries and Businesses Standard version 2, RCR STD-28, Figure 4.2.23.7, page 88, 1995). Given that Mistubishi Electric, Ltd. (the assignee for Kono) was a member of ARIB and was actively involved in the development and deployment of PHS in the mid-1990's, it is likely that Kono was using the Unique Word in the same sense employed in PHS.

At the same time, the Unique Word does not constitute "signaling information" in any customary and ordinary sense. In particular, the *Telecommunications: Glossary of Telecommunication Terms* Federal Standard 1037C ("FS-1037C"), published 23 August 1996, provides the following definition of *signaling*:

> **signaling: 1.** The use of signals for controlling communications. **2.** In a telecommunications network, the information exchange concerning the establishment and control of a connection and the management of the network, in contrast to user information transfer. **3.** The sending of a signal from the transmitting end of a circuit to inform a user at the receiving end that a message is to be sent. *[citations omitted]*

Using this definition, the customary and ordinary definition of *signaling information* would be control information that is provided by the telecommunications network, to set up and manage the network, inform user receiver that a message is to be sent, or otherwise control communications of the network.

The Unique Word meets none of these criteria. The UW is not used for controlling communications in Kono; any commands sent from the base transceiver station due to analysis of the UW are sent over the prior art control channel using the control channel transceiver *12a-12n*. The UW is never used to establish and control communications. The UW does not constitute "user information" of any sort; it is a known sequence. And the UW is never used to inform the base transceiver station that a message is to be sent — in the one instance taught in Kono in which such a message *is* sent (TruePosition Kono Translation, pg.TPI0067421, Col. 1, ll 40-47), Kono teaches that the message is sent on a separate channel from the position location signal

> "... it [the mobile unit] immediately transmits a response and switches to the common channel and transmits a position location signal ..." (TruePosition Kono Translation, pg.TPI0067421, Col. 1, ll 44-46)

Lastly, because there is ample precedent for incorporation of Unique Words' into synchronization bursts, traffic (voice) channels, etc., as seen in the PHS standard, and because Kono teaches no other aspect of the position location signal, the position location signal is not inherently a control channel signal.

Dr. Goodman makes no attempt to argue that the common channel is a control channel, other than providing a tortuous (and incorrect) argument that they possess a "many-to-one" property that is also possessed by control channels. In fact, *any* reverse wireless channel theoretically possesses a "many-to-one" property, as multiple mobile units that are designed to operate in the cellular network could use that channel to simultaneously transmit to a single base transceiver station if not prevented from doing so. Among other features, the *signaling information* transmitted over the control channel is generally designed to prevent that from happening. In any event, Dr. Goodman's argument fails to satisfy (or even address) the definition of "control channel" proposed under the Andrew or TruePosition Claim Constructions.

Dr. Goodman also appears to present contradictory opinions on the status of the position location signals in his summary. For example, on row 3 and 6 (page 15-16, relating to Claim 1) of his first *Summary Chart Reflecting Opinions*), he writes (highlighting mine):

Claim Language	Present in Kono	Kono Disclosure
...		
each initiating periodic signal transmission over one of a prescribed set of reverse control channels, comprising	Yes	"a moving body transmits position locating signals using shared channels,"
...		
a baseband convertor operatively coupled to said antenna for receiving cellular telephone signals transmitted over a reverse control channel by said telephones and providing baseband signals derived from the cellular telephone signals;	Yes	Control channel transceivers *12a-12n*
...		

That is, in the same summary table, he appears to equate "reverse control channels" to "shared channels" (the common channels processed by the common channel receiver), then (three rows later in the same table) he claims that the baseband convertor processing these channels is part of the "Control channel transceivers *12a-12n*" shown in Figures 1 (invention) and 4 (prior art) of Kono. Given that Dr. Goodman clearly understands that the position location signals are processed by the common (shared) channel receiver in Kono, not the control channel transceivers, I must conclude that one or both of these summary conclusions does not reflect Dr. Goodman's true opinion on this matter.

Kono fails to teach a timing signal *receiver* receiving a timing signal common to all cell sites

Kono fails to teach a timing signal *receiver* of any sort, or a timing signal common to all cell sites, or a means for receiving such a timing signal. The only teaching of timing is in Figure 2 of Kono and the description of the first embodiment, where Kono teaches (highlights mine):

> "The standard clock *54* is an ultra high precision clock, and the time measurement clock measures the absolute time of the foregoing triggering, and a report is issued from the control circuitry *55* to the exchange office *1* via the control device *11*. Also, conversely time corrections to the standard clock are made by the exchange office *1* ..." (TruePosition Kono Translation, pg. TPI067422, Col. 1, line 49-51, Col. 2, ll 1-4)

Figure 2 of Kono additionally shows signal lines connecting the standard clock to the time measurement clock *53* and a control circuit *55*, which is in turn connected to a control device *11*. No "timing signal receiver" is shown in any of the Figures, or taught in the text of Kono.

From this passage and the accompanying Figure, it can be inferred that a timing signal is generated *within* the common channel receiver by the ultra high precision clock *54*, and is used to synchronize interconnecting pieces of equipment within the common channel receiver. It can also be inferred that the exchange office can send corrections to the clock over the control device *11*. A *receiver* is not required to supply this timing signal to the time measurement clock *53* or the control device *11*. Conversely, a *receiver* is not required to transfer corrections from the exchange office *1* to the control device *11*, or to transfer corrections from the control device *11* to the standard clock *54*. This could be accomplished, for example, by embedding timing advance/delay over the control channels already instituted between the exchange office and the base transceiver stations in the prior art. Hence, the transfer of timing *corrections* from the exchange office does not inherently imply the existence of a timing signal *receiver* to accomplish these corrections.

Moreover, these corrections must be different for each cell site, else they would not be needed to bring the network into synchronization. Consequently, the "signal" (corrections) sent to each base transceiver station would not be "common to each station." Similarly, any signals sent from the base transceiver stations to the exchange office, e.g., to provide calibration signals for the exchange office to use in formulating these corrections, would of necessity *not* be "common to all cell sites," else there would be no need to send those signals in the first place.

More importantly, the 144 patent clearly teaches the use of a GPS disciplined clock, i.e., a clock disciplined by a timing signal received from Global Position System satellites, as one way to achieve this function (e.g., 144 patent, Col. 17, ll 33-36). Noth-

ing in Kono teaches a similar receiver, nor does any sort of correction applied from an exchange office inherently teach such a receiver.

Dr. Goodman states that "the corresponding device [to a timing signal receiver receiving a timing signal common to all base stations] is the ultra-high precision clock *54*," which, of course, does not necessarily contain a receiver of any sort. As explained above, if it *does* contain a receiver, to receive corrections from the exchange office, that receiver would not inherently receive a timing signal common to all cell sites. Instead, it would (as taught in Kono) receive *corrections*, which would of necessity be *different* at each cell site. Dr. Goodman is mute on the use of GPS for reception in regards this Claim.

Kono fails to disclose or teach a sampling subsystem ... for sampling said baseband signal

Kono fails to disclose or teach "a sampling subsystem ... for sampling [a] baseband signal" of any sort. Figure 2 of Kono presents a subblock *51*, referred to as a *Wave detector* in the Figure, and a *detector/decoder* in the text, that does not expressly or inherently implement a sampling function. In the description of the first embodiment, Kono teaches (highlighting mine):

> "... when some of the common channel transceivers *16a-16n* at the various base transceiver stations *3a-3n* receive a position location signal from the mobile unit *5*, they perform a correlation detection on a unique word by measuring the absolute or relative time at which the position location signal arrived, ..." (TruePosition Kono Translation, pg. TPI067421, Col. 1, ll 50-51, Col. 2, ll 1-4)

In its description of Figure 2, Kono additionally teaches (highlighting mine):

> "... at detector/decoder *51* it *[the baseband position location signal]* is decoded into a position location signal. The position location signal contains a unique word of about 14 bits, and at the unique word detector circuit *52*, the difference between it and the original unique word is detected, and at the point in time when the correlation peaks, the time measurement circuit *53* is triggered." (TruePosition Kono Translation, pg. TPI067422, Col. 1, ll 42-49)

where the "baseband position location signal" is the output of the "baseband processor" employed at the previous stage of the invention. From these passages, it can be inferred that the *intent* of the Wave detector 51 is to determine the time of arrival of the position location signal, and that the Wave detector does this by first *decoding* the position location signal into a bit sequence containing a 14 bit Unique Word, comparing that Unique Word to the original Unique Word using a cross-correlation process, and detecting the peak of the correlation function generated by the correlation process.

None of these operations require a "sampling subsystem." The FS-1037C defines "sampling" (equivalent to "signal sampling" in the glossary) as:

> **signal sampling:** The process of obtaining a sequence of instantaneous values of a particular signal characteristic, usually at regular time intervals. *[citations omitted]*

Similarly, the FS-1037C defines "decode" as:

> **decode: 1.** To convert data by reversing the effect of previous encoding. **2.** To interpret a code. **3.** [To] convert encoded text into equivalent plain text by means of a code. [NIS] Note: Decoding does not include deriving plain text by cryptanalysis. *[citations omitted]*

That is, *decoding* involves the process of converting the baseband position location signal back into a bit sequence, so that the Unique Word can be found within the decoded position location bit sequence, while *sampling* involves the process of simply measuring the *instantaneous value* of the baseband position location signal at known time instants. Depending on the specific modulation format used to generate the position location signal (not provided in Kono), the decoding process can be significantly different from a simple sampling operation. Moreover, this decoding process almost always significantly reduces the fidelity of the signal measurements, e.g., by quantizing the received signal to the transmitted signal symbol values in amplitude (e.g., ±1 for a BPSK position location signal) and to the bit period in time (e.g., 20 μs time intervals for a 50 kbps position location signal). Sampling and decoding are therefore inherently different operations, that lead to inherently different capabilities and performance for systems employing these operations.

Moreover, a person of ordinary skill in the art seeking to modify Kono to provide true geolocation capability, e.g., to provide the 1/50 bit precision (erroneously) cited as the performance of the Kono system, would need to perform undue experimentation of Kono to obtain this improvement, and could obtain that performance without implementing a sampling subsystem. For example, one could obtain substantially better correlation performance than the approach described in Kono (i.e., using detector/decoder 51) by using an analog matched filter tuned to the modulated (analog) Unique Word waveform.

My opinion is consistent with opinions expressed by the 144 patent inventors. In ll 1,342-1,376 of Dr. Webber's deposition, the following exchange occurs between Andrew's counsel (Rachel Pernic Waldron) and Dr. Webber, regarding a means for instantiating a sampler referred to as an *analog-to-digital convertor* (highlighting mine):

Ms. Waldron: *"You mentioned the converter for converting analog to digital. Was that necessary because all the signals you were working with at that time started off as analog waveforms?"*

Dr. Webber: "It is primarily because it's most convenient to perform the cross-correlation function using digital versions of the signals rather than the original analog versions. It's more stable and easier to implement."

Ms. Waldron: *"And it was necessary to convert them because they started — the signals started off as analog waveforms?"*

Dr. Webber: "All signals are analog waveforms. By convention, some signals intended to convey only a series of numbers are modulated in such a fashion that it is possible easily to recover those numbers from the transmitted analog signal originally generated, but they are intrinsically — everything in the world is analog. Digits are a human invention. Analog is the real world."

Ms. Waldron: *"Would a converter — would an analog-to-digital converter be necessary in a current wholly digital system like GSM?"*

Dr. Webber: "Yes, because the signals are — well, its not strictly necessary. It is possible to transmit the original version of the signals in their original analog form with no conversion to digital and perform the cross-correlation in analog circuitry; however, the stability of analog circuitry is such that in standard radio interferometry techniques, it is much easier to maintain the requisite stability of the system by converting from the analog to the digital domain using a precision clock at the earliest step possible.

As a consequence, a sampling subsystem is not inherent to the Wave detector or (equivalently) the detector/decoder taught in Kono.

Dr. Goodman fails to address this Claim element in his report.

Kono fails to disclose or teach "formatting the sample signal into frames of digital data"

Kono fails to disclose or teach "formatting of the sampled baseband signal ... into frames of digital data comprising *data bits*" and time stamp bits representing the time at which that data was received. Kono only teaches reporting of the mobile unit zone location from the nearest (strongest) base station, and reporting of timing data derived from the position location signal to the exchange office.

In its description of the first mode of operation for the first embodiment, Kono teaches (highlights mine):

> "The base transceiver station 3a, upon receiving the response signal, reports to the exchange office *1* that the mobile unit 5 is within its zone. Also, when some of the common channel transceivers *16a-16n* at the various base transceiver stations *3a-3n* receive a position location signal from the mobile unit *5*, they perform a correlation detection on a unique word by measuring the absolute or relative time at which the position location signal arrived, and the resulting data on the absolution *[sic]* or relative time at the base transceiver stations is reported via the control devices *11a-11n* to the exchange office *1*." (TruePosition Kono Translation, TPI0067421, Col 1 ll 47-51, Col 2 ll 1-7)

In its description of the second mode of operation for the first embodiment, Kono teaches (highlights mine):

> "When the common channel receivers *16a-16n* receive the position location signal, the arrival time of a unique word therein is measured, and this data is reported to the exchange office *1* via the control devices *11a-11n*." (TruePosition Kono Translation, TPI0067421, Col 2 ll 41-46)

In its description of the common channel receiver (used in both embodiments), Kono teaches (highlights mine):

> "... the time measurement clock measures the absolute time of the foregoing triggering, and a report is issued from the control circuit to the central office." (TPI0067422, Col. 1, ll 50-51, Col. 2 ll, 1-2)

These are the only "reports" explicitly taught in Kono. The terms "frame," "frame of data," "data bit," "time stamp," and "time stamp bit" appear nowhere in Kono.

Consequently, in my expert opinion, Kono explicitly teaches only a data report comprised of (a) the base station transceiver zone that the mobile is residing in when the position location signal is transmitted, and (b) the absolute or relative time meas-

urement representing the time at which the position location signal was received at the base transceiver station. Kono does not teach reporting of data bits provided by a "sampling subsystem" as required by the 144 Patent claim. Nor does Kono teach reporting of data bits to the exchange office that were provided by the nearest equivalent to a "sampling subsystem" in the common channel receiver, i.e., the decoded position location signal bits provided by the detector/decoder *51*.

Dr. Goodman agrees that only time of arrival information is reported to the exchange office by Kono's common channel receiver. On page 13, ll 25-27 of his report, he writes:

> "A time measurement circuit *(53)* in each base station measures the absolute time of arrival and reports it to the switching station. A person of ordinary skill in the art would recognize that the report would be contained in data frames."

While I concur with Dr. Goodman's opinion in the second sentence of the preceding passage that *the report* "would be contained in data frames," his opinion is insufficient for anticipation. In order to anticipate the "formatting the sample signal into frames of digital data" element of Claim 1 in the 144 Patent, the data frame in Kono must also contain data bits from the sampled baseband signal. By Dr. Goodman's own admission, Kono's data frame contains no such data bits.

Kono fails to disclose or teach means for processing said data frames from cell site systems, to generate a table

Kono fails to disclose or teach means for processing said data frames from cell site systems (base station transceivers in Kono) to generate a table of any sort, much less the specific processing means defined by both the Andrew Claim Constructions and the TruePosition Claim Constructions. In addition, Kono fails to expressly or inherently teach a table "identifying individual telephone signals" that is consistent with its Claim construction for that Claim element.

In regards "means for processing ... to generate a table," Andrew Claims Construction direct me to consider only the elements considered in Figures 6 and 6A of the 144 patent and "algorithms disclosed in the [144] patent" to interpret this Claim element. As taught by Col 12, lines 1-47 of the 144 Patent (Section 2, *Central Site Systems*), Figure 6 in the 144 Patent teaches processing of data frames containing sampled baseband data (DATA A and DATA B samples, or DATA A, DATA B1, and DATA B2 signals, in Col 12, ll 16-25) *at the central site* (exchange office *1* in Kono), to directly and centrally compute the *differences* in time of arrival of data collected at all of the cell sites (base transceiver stations *3a-3n* in Kono), using a complex cross-correlation method. As taught in Col 12, line 48 through Col 13, line 28 of the 144 Patent, Figure 6A in the 144 Patent teaches a means for performing this cross-correlation efficiently using a combination of shift registers, low-precision (two-bit) multipliers, and counters (integrators).

Similarly, TruePosition's equivalent Claim Construction directs me to consider only the first four blocks of Figure 7, and all of Figures 8A and 8B (less references to FDOA), and accompanying text describing these Figures. The first four blocks in Figure 7 requires reception of frames of data from all cell sites, and cross-correlation of that data to generate a table of difference of times of arrival. From Col 13, ll 33-56, and from the processing steps shown in Figures 8A and 8B, e.g., the references to "sampled signal portion of each frame" taught on Col 13, ll 38-40, third and fifth blocks in Figure 8A, it is clear that this cross-correlation operation is performed using the sampled signal data contained within these frames of data and provided from the cell sites. Lastly, this data is clearly processed to compute time *differences* of arrival (or *differences* in times of arrival).

That is, under both Claim Constructions, the central site (exchange office in Kono) must receive frames of data containing sampled baseband signals from the cell sites (base transceiver stations in Kono), and must process this data *at the central site* using a cross-correlation operation, to anticipate this element of Claim 1.

However, Kono teaches exactly four sets of actions/operations by the exchange office:

- Sending of commands (over the control channel) for the mobile unit to transmit a position location signal, when the mobile unit is actively connected to the network and standing by on the forward control channel (TruePosition Kono Translation, pg. TPI0067421, Col 1, ll 32-36).
- Sending of data (time of arrival reports) to the position location computer [device] 2, [to] compute the position of the mobile unit 5 when a position location signal is transmitted from that mobile unit (TruePosition Kono Translation, pg. TPI0067421, Col 2, ll 7-10 and ll 46-48, and pg. TPI0067422, Col. 2, ll 28-32).
- Sending of inquiries about empty channels to the control device, or issuing commands (over the control channel) for the mobile unit to switch to an empty channel and setting up such a channel for the mobile unit (TruePosition Kono Translation, pg. TPI0067421 Col 1, ll 48-52, pg. TPI0067422, Col 1, ll 1-5).

- Executing conclusion operations when either the public communication network of the mobile unit ends the call (True-Position Kono Translation, pg. TPI0067422, Col. 1, ll 9-12).

These actions/operation are not remotely similar to the actions required to anticipate Claim 1 of the 144 Patent. Kono's exchange office actions/operations teach nothing more than a distributed method that computes the *times of arrival* (not ~~*differences in times of arrival) of data collected at the base transceiver stations, using processing means implemented at those base transceiver stations.* Figure 6 of the 144 Patent diverges from these actions/operations at the *very first processing block* in Figure 6, where the "antenna samples" are fed into the T1 CSU (16-1). This method cannot possibly anticipate this element of Claim 1 under Andrew's proposed Claim Construction. Figure 7 of the 144 Patent diverges from these actions/operations in the first two blocks, where frames of data are received from all of the cell sites and cross-correlated against each other, e.g., using the method taught in Figure 8A of the 144 Patent.

In regards Andrew's Claim Construction for "identifying individual telephone signals," there is no inherent reason to associate time of arrival information for a given mobile unit, defined as

> "a number linked only with that mobile cellular telephone and no other mobile cellular telephones, such as the telephone number" (Andrew Claim Construction, pg. 2, *Identifying individual cellular telephone signals*)

using anything taught in Kono. Kono fails to teach either a table of individual cellular telephone signals, or a table of differences in times of arrival of position location signals, nor are any of these tables inherently required by the system taught in Kono. Moreover, there is no inherent need to store mobile telephone numbers, differences in times of arrival, or position locations at the exchange office under Kono. Instead, Kono's exchange office could compile times of arrival for long enough to compute a position; compute the position; take action based on that location (e.g., command the mobile to move to a new frequency and base station zone); and revert back to normal operation. At the conclusion of the call, any of this information could be deleted as part of the "conclusion operations" without compromising the position location operation. Moreover, there is no inherent need to generate a table of *differences* in times of arrival. The position location operation can be implemented using the *times of arrival* reported from the individual base transceiver stations themselves.

Dr. Goodman fails to directly address this element of Claim 1 in his report. Instead he concludes that reporting the time of arrival information to Kono's exchange office is equivalent to building the table required by Claim 1 of the 144 Patent. Again, a report of time of arrival information cannot inherently anticipate a *table* of *differences* of times of arrival under Andrew's or TruePosition's proposed Claim Constructions.

Kono fails to disclose or teach *any* means for determining the locations of cellular telephones

Kono fails to disclose or teach *any* means for determining the locations of cellular telephones based on times of arrival differences, much less the specific locating means defined by both the Andrew Claim Constructions and the TruePosition Claim Constructions.

Andrew's Claim Constructions direct me to evaluate this element of Claim 1 based on Kono teaching the *function* of

> "to determine on the basis of time of arrival differences, the locations of the mobile cellular telephones whose signals are received"

using a structure comprising

> "a general purpose computer programmed with the algorithm disclosed in the 144 patent using least squares."

TruePosition's Claim Constructions direct me to evaluate this element of Claim 1 based on Kono's teaching of the fifth and sixth blocks of Figure 7, Figure 8C, and the top four elements of Figure 8D, and certain text accompanying those blocks.

Kono again fails to expressly or inherently anticipate these operations. At the end of the description of the first mode of operation for the first embodiment, Kono teaches (highlighting mine):

> "... the resulting data on the absolution or relative time at the base transceiver stations is reported via the control devices *11a-11n* to the exchange office *1*. The exchange office *1* transfers these data to the position location computer device 2, which computes the position of the mobile unit *5*. In this case, when there is an adequately high number and density of common channel transceivers *16a-16n* it is possible to obtain sufficiently high precision in the position location." (TruePosition Kono Translation, pg. TPI067421, Col. 2, ll 5-7)

At the end of the description of the second mode of operation for the first embodiment, Kono teaches (highlighting mine):

> "... when the common channel receivers *16a-16n* receive this position location signal, the arrival time of a unique word therein is measured, and this data is reported to the exchange office *1* via the control devices *11a-11n*. The exchange office *1* in turn sends this data to the position location computer *2*, which locates the position of the mobile unit *5*. (TruePosition Kono Translation, pg. TPI067421, Col. 2, ll 46-48)

At the end of the description of the second embodiment (shown in TruePosition Kono Translation, Figure 3), Kono teaches (highlighting mine):

> "When the mobile unit *5* transmits a position location signal on the common channel, its arrival time is measured and that data is reported to the exchange office *1*. The exchange office *1* transfers the data from the base transceiver stations *3a-3n* and the data from the position location bureaus *7a-7k* to the position location computer device *2*, where the position of the mobile unit *5* is computed." (TruePosition Kono Translation, pg. TPI0067422, Col 2, ll 25-32)

These are the only passages in Kono in which "means for determining location" are discussed.

Kono is mute on the algorithm used to compute that location. In particular, the "method of least squares" is *not* inherent to position location; less computationally complex location methods based on non-least-squares metrics (e.g., "taxicab" metric) can be used and may have advantages in applications of clear interest to Kono, e.g., identification of changes in base station zones occupied by mobile units. Consequently, Kono fails to expressly or inherently anticipate these means under the Andrews Claim Constructions.

Similarly, neither the fifth and sixth blocks of Figure 7, nor the top four elements of Figure 8D, nor the text accompanying those blocks in TruePosition's Claim Constructions, are taught by Kono. Moreover, the "filtering" operation shown in the fifth block of Figure 7 and taught in Col 13, ll 58-59 of the 144 Patent, the linearized weight least-squares technique shown in the first element of Figure 8D and taught in Col 18, ll 17-18 and line 31 of the 144 Patent, or the alternating LAT-LON search method shown in the last other three of the top four elements of 8D and taught in Col 18, ll 13-34 of the 144 Patent are not inherent to a position location algorithm based on times of arrival differences. Consequently, Kono fails to expressly or inherently anticipate these means under the TruePosition Claim Constructions.

Dr. Goodman completely fails to provide any argument teaching *how* the "means for location" taught by Kono are related to Andrew's (or TruePosition's) proposed Claim Constructions.

3.3.1.2 Detailed Opinions Relating to Kono and Claim 2 of the 144 Patent

A summary of my conclusions regarding the teachings of Kono to one having ordinary skill in the art at the time and the limitations in Claim 1 of the 144 Patent is set forth in Table 3-2 above. My opinions supporting these conclusions are provided below.

First, as discussed in the passage in Subsection 3.3.1.1 entitled "Kono fails to teach a timing signal *receiver* receiving a timing signal common to all cell sites," Kono fails to teach a timing signal *receiver* of any sort, much less a timing signal common to all cell sites, much less a GPS receiver. In particular, the method for timing control taught by Kono is not *inherently* implemented using a GPS disciplined clock. Nothing in Kono teaches a similar receiver, nor does any sort of correction applied from an exchange office inherently teach such a receiver.

My opinion is consistent with opinions expressed by the 144 patent inventors. In ll 1,377-1,388 of Dr. Webber's deposition, Dr. Webber provides the following additional information at the end of the exchange listed abover on analog-to-digital conversion (highlighting mine):

> Dr. Webber: "... So, another additional piece of equipment required in the overall conversion process from our radio frequency to a lower frequency band and then subsequently converting to digits is an accurate clock, an accurate time reference. So an ancillary piece of equipment for this project was a disciplined GPS oscillator, which provided signals with the required phase and time stability for both the down-conversion and the digitization. It's not strictly necessary. It's just convenient and relatively inexpensive to achieve the required performance."

In ll 2,404-2,417 of Dr. Webber's deposition, Dr. Webber and Andrew's counsel have the following additional exchange on this matter (highlighting mine):

> *Ms. Waldron: "Could you describe exactly what a timing signal receiver does?"*
>
> Dr. Webber: "A timing signal receiver provides, in some fashion, a relative time reference in order to identify the exact time at which the signal was received at each cell telephone site. That — in the system it was

> GPS receivers at each site. One could use some other synchronizing signal that's widely disseminated, such as a LORAN signal, or one could put rubidium clocks at each site, which keep accurate time to a microsecond per month. But some means must be provided of identifying exactly the time at each cell telephone tower and relating those times to each other."

Dr. Goodman fails to address inherency of the timing signal receiver in his report. Instead, on page 14 of his report, he states that correction of the clock using a GPS clock was known in 1993. However, this observation fails to satisfy the criteria for inherency of a GPS receiver given Kono, since Kono mentions nothing about a GPS clock and timing correction could be provided without a GPS receiver, as noted by Dr. Webber above.

3.3.1.3 Detailed Opinions Relating to Kono and Claim 22 of the 144 Patent

A summary of my conclusions regarding the teachings of Kono to one having ordinary skill in the art at the time and the limitations in Claim 22 of the 144 Patent is set forth in Table 3-3 above. My opinions supporting these conclusions are provided below.

- Kono fails to disclose or teach any locating means for automatically determining the locations of cellular telephones. Instead, it teaches a "command-respond" approach in which position location only occurs after a command (position location call) is sent from either the exchange office (based on unexplained criteria) or the base transceiver station.
- Kono fails to disclose or teach location by receiving and processing signals emitted during reverse control channel transmissions. Instead, it locates the telephones using signals emitter received and processed on common channel that is not a control channel under either Andrew's or TruePosition's Claim Constructions.
- Kono fails to disclose or teach *any* database means for storing location data, much less the specific database means defined by both the Andrew Claim Constructions and the TruePosition Claim Constructions.

My detailed opinions supporting these conclusions are provided below.

Kono fails to disclose or teach any locating means for automatically determining the locations of cellular telephones.

Kono fails to disclose or teach any locating means for automatically determining the locations of cellular telephones, under either the Andrew or TruePosition Claim Constructions. Instead, it teaches a "command-respond" approach in which position location only occurs after a command (position location call) is sent from either the exchange office (based on unexplained criteria) or the base transceiver station (based on degradation of the mobile signal quality on the mobile traffic channel, as taught in the TruePosition Kono Translation, pg. TPI0067421, ll 34-38).

Andrew's Claim Construction for "locating means ..." directs me to "automatically determine the location of cellular telephones (function) ... using a general purpose computer programmed with the algorithm disclosed in the 144 patent using least squares." As explained in the passage in Subsection 3.3.1.1 entitled "Kono fails to disclose or teach *any* means for determining the locations of cellular telephones," Kono fails to expressly or inherently disclose or teach any structure or algorithms for determining the location of the cellular telephones. Thus, Kono also fails to teach a "least squares algorithm" of any sort, such as the algorithm taught in the 144 Patent. As this passage also explains, the least squares algorithm taught in the 144 Patent is not inherent to position location, and can be replaced by other algorithms, e.g., algorithms based on non-least-squares metrics, or least-squares algorithms that do not employ linearized-weight-least-squares iterations in their formulation, based on other implementation requirements such as processor complexity. Consequently, Kono fails to expressly or inherently anticipate locating means under the Andrews Claim Constructions.

Similarly, TruePosition's Claim Construction for "locating means ..." directs me to evaluate this element of Claim 22 based on Kono's teaching of the first six blocks in Figure 7, Figures 8A-8C, and the top four elements of Figure 8D of the 144 Patent, and the text accompanying those Figures. As is also explained in the passage in Subsection 3.3.1.1 entitled "Kono fails to disclose or teach *any* means for determining the locations of cellular telephones," Kono fails to expressly or inherently anticipate "locating means ..." under this Claim Construction, for the same reasons given in that passage.

Dr. Goodman fails to address either of these Claim Constructions in rendering his opinion. Moreover, since the "shared [common] channel receiver and its associated blocks are not part of the exchange office, and (as explained in the passage above) Kono fails to teach *any* operations in the position locating device, his argument cannot be interpreted in light of these Claim Constructions.

Kono fails to disclose or teach location by receiving and processing signals emitted during reverse control channel transmissions

As explained in the passage in Subsection 3.3.1.1 entitled "Kono fails to teach reception and provision of *reverse control channel* cellular telephone baseband signals," Kono does *not* process "periodic reverse control channel transmissions" in the common channel receiver in any event, but instead processes the *position location signals*, which are (as explained in that passage) *not* control channel transmissions under either Andrew's or TruePosition's Claim Constructions.

Dr. Goodman again provides contradictory information in his report, by attempting to imply that

> "the elements of the Kono application that perform this function [receiving and processing signals emitter during said periodic reverse control channel transmissions]

are

> "the shared [common] channel receivers in the base stations"

in the fourth paragraph on page 14 of his report, and then, in his applicable summary table on page 17 of his report, he states (highlighting mine):

Claim Language	Present in Kono	Kono Disclosure
...		
equipped to receive signals sent by multiple mobile cellular telephones	Yes	Control channel transceivers *12a-12n*
each initiating periodic signal transmission	Yes	"a moving body transmits position locating signals using shared channels,"
over one of a prescribed set of reverse control channels	Yes	"*12a-12n* are control channel transceivers that transmit and receive signals for the control channels allotted for each of the base stations *3a-3n*."
...		

That is, Dr. Goodman appears to acknowledge that the "reverse control channels" are the channels connected to the control channel transceivers *12a-12n* in Kono, but then appears to imply that the signals *sent* over these control channels, and received and processed by the *control channel transceivers 12a-12n*, are the *position locating signals*. However, on page 14 of his report, he also acknowledges that these signals are both (a) sent over the *shared* [common] channels and (b) processed by the shared [common] channel receiver at the base transceiver station.

Again, given his contradictory statements here, I can not ascertain his true opinion is on this matter. However, he advances no argument anywhere in his report explicitly stating an opinion that the position location signals are control signals, or that the shared [common] channel is a control channel.

Kono fails to disclose or teach *any* database means for storing location data

Kono fails to disclose or teach *any* database means for storing location data, much less the specific database means defined by both the Andrew Claim Constructions and the TruePosition Claim Constructions.

In regards "database means for storing location data ...", Andrew's Claim Constructions direct me to consider only whether Kono teaches (highlighting mine):

> "storing location data identifying the cellular telephones and their respective locations, and for providing access to the database to subscribers at remote locations"

using

> "a database or local disk storage device containing the telephone number corresponding to each cellular telephone and a terminal coupled to the database via (1) modem and telephone line, or (2) radio communication providing access to the database and user."

However, as I explain in the passage in Subsection 3.3.1.1 entitled "Kono fails to disclose or teach means for processing said data frames from cell site systems, to generate a table," Kono fails to teach either a table of individual cellular telephone sig-

nals, or (as can be ascertained from my listing of exchange office actions) a table of mobile locations. Moreover, as also explained in this passage, there is no inherent need to store the mobile telephone number or position location at the exchange office in order to perform position location using the method taught in Kono. Kono therefore fails to anticipate this element of Claim 22 under Andrew's Claim Constructions.

Similarly, TruePosition's Claim Constructions direct me to consider only Kono's teaching of blocks 20 and 22, *or* blocks 22 and 24, *or* blocks 20 and 26, in Figure 2 of the 144 Patent, and text accompanying those Figure blocks. Again, as explained in the passage in Subsection 3.3.1.1 entitled "Kono fails to disclose or teach means for processing said data frames from cell site systems, to generate a table," no database of any type is expressly or inherently taught by Kono. Moreover, even if the exchange office had a database, which it does not, the *only* actions/operations taken by the exchange office in Kono are between the exchange office and the base transceiver stations or mobile, no operations are described between the exchange office and nonmobile network users, and no operations are necessary for performance of a position location function. Kono therefore fails to anticipate this element of Claim 22 under TruePosition's Claim Constructions.

Dr. Goodman attempts to argue that the database is "obvious" in light of "equivalent" Home Location Registers (HLR's) and Visitor Location Registers (VLR's) defined for GSM networks. However, the "Location" specified in GSM networks of that period *necessarily* did *not* include the geolocation of the mobile unit, as is required under Andrew's or TruePosition's Claim Constructions.[1]

3.3.1.4 Detailed Opinions Relating to Kono and Claim 31 of the 144 Patent

A summary of my conclusions regarding the teachings of Kono to one having ordinary skill in the art at the time and the limitations in Claim 31 of the 144 Patent is set forth in Table 3-4 above. My opinions supporting these conclusions are provided below.

- Kono fails to disclose or teach a method for determining the location(s) of mobile cellular telephones by receiving reverse control channel signals at at least three cell sites.
- Kono fails to disclose or teach "processing said signals ... to produce frames of data comprising a prescribed number of *data bits*" and time stamp bits. Kono instead teaches processing *position location signals* to produce a data report comprised of (a) the base station transceiver zone that the mobile is residing in when the position location signal is transmitted, and (b) the absolute or relative time measurement representing the time at which the position location signal was received at the base transceiver station..
- Kono fails to disclose or teach identification of cellular telephones on the basis of *differences* in times of arrival among cell sites.
- Kono fails to disclose or teach "determining, on the basis of times of arrival differences, the locations of the cellular telephones."

My detailed opinions supporting these conclusions are provided below.

Kono fails to disclose or teach a method for determining the location(s) of mobile cellular telephones by receiving reverse control channel signals at "at least three ... cell sites"

Kono fails to disclose or teach a method for determining the location(s) of mobile cellular telephones by receiving *reverse control channel signals* at at least three geographically separated cell sites. My reasons for this opinion are given in the passage in Subsection 3.3.1.1 entitled "Kono fails to teach reception and provision of *reverse control channel* cellular telephone baseband signals".

Dr. Goodman only states a summary opinion in regard this Claim element, in a Table on pp. 18-19 of his report. The rows of this Table that are germane to this Claim element are shown below (highlighting mine):

[1]While Dr. Goodman has expressed no opinion and provided no analysis of any alleged obviousness, I note that the database discussed in this Claim element of the 144 Patent meets multiple criteria for secondary considerations of nonobviousness in my expert opinion, if only due to the enormous, long-felt need for true geolocation of mobile telephones (e.g., as exemplified by the E-911 initiative conceived in the early 90's); and the commercial success that has flowed to TruePosition since its development of this technology.